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# COMMITTEE DRAFT EAST AFRICAN STANDARD

## Disposable plastic cutlery — Specification



## EAST AFRICAN COMMUNITY



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## Copyright notice

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# Foreword

Development of the East African Standards has been necessitated by the need for harmonizing requirements governing quality of products and services in the East African Community. It is envisaged that through harmonized standardization, trade barriers that are encountered when goods and services are exchanged within the Community will be removed.

The Community has established an East African Standards Committee (EASC) mandated to develop and issue East African Standards (EAS). The Committee is composed of representatives of the National Standards Bodies in Partner States, together with the representatives from the public and private sector organizations in the community.

East African Standards are developed through Technical Committees that are representative of key stakeholders including government, academia, consumer groups, private sector and other interested parties. Draft East African Standards are circulated to stakeholders through the National Standards Bodies in the Partner States. The comments received are discussed and incorporated before finalization of standards, in accordance with the Principles and procedures for development of East African Standards.

East African Standards are subject to review, to keep pace with technological advances. Users of the East African Standards are therefore expected to ensure that they always have the latest versions of the standards they are implementing.

The committee responsible for this document is Technical Committee EASC/TC 072, *Plastics and related products*.

Attention is drawn to the possibility that some of the elements of this document may be subject of patent rights. EAC shall not be held responsible for identifying any or all such patent rights.



 

# Disposable plastic cutlery — Specification

## 1 Scope

This Committee Draft East Africa Standard specifies requirements, sampling and test methods for single use plastic cutlery, which are intended for use in contact with food and drinks up to a maximum service temperature of 100 ˚C.

The Committee Draft East Africa Standard does not cover biodegradable single-use plastic cutlery.

## 2 Normative references

The following documents are referred to in the text in such a way that some or all of their content constitutes requirements of this document. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

EAS 1086, *Plastics codes for resin identification on plastic products*

ASTM D790, *Standard Test Methods for Flexural Properties of Unreinforced and Reinforced Plastics and Electrical Insulating Materials*

ISO 11737-1:2018*, Sterilization of health care products — Microbiological methods*

## 3 Terms and definitions

For the purposes of this document, the following terms and definitions apply.

ISO and IEC maintain terminological databases for use in standardization at the following addresses:

— IEC Electropedia: available at http://www.electropedia.org/

— ISO Online browsing platform: available at http://www.iso.org/obp

**3.1**
**plastic cutlery**
any single-use or disposable utensil, such as a fork, spoon, spork, or knife, made predominantly of plastic typically derived from petroleum-based or biodegradable polymers

**3.2**
**biodegradable**
capable of being broken down naturally by microorganisms (such as bacteria, fungi, or enzymes) into simpler, non-toxic components like water, carbon dioxide, and biomass without leaving harmful residues in the environment



 

# 4 Requirements

## 4.1 General requirements

**4.1.1** All materials used in the manufacture of the single use plastic cutlery shall be virgin food grade.

**4.1.2** There shall be no odour

**4.1.3** The colour shall be normal with no clear discolouration, uneven colours (unless required for decoration purposes) or stains.

**4.1.4** There shall be no cracks, no grease, dirt, dust, mould or other foreign bodies on the surface.

**4.1.5** The surface shall be smooth and clean with uniform texture, no scratches, no puckering, no peeling, no ruptures and no perforations

**4.1.6** If there is any painting on the surface of the plastic cutlery, the painted surface shall have no sagging, peeling, breaching or blistering.

**4.1.7** The edges of the plastic cutlery shall be smooth, tidy and neat.

**4.1.8** The material shall be free from toxic additives such as BPA, lead, or phthalates**4.1.9** All cutlery shall resist breakage and /or distortion due to normal use.

## 4.2 Specific requirements

### 4.2.1 Drop performance

When tested in accordance with Annex A, there shall be no cracks or splits to any of the three samples.

### 4.2.3 Hot oil resistance and hot water resistance

When tested in accordance with Annex B, there shall be no deformations, peelings or wrinkles to the single use plastic cutlery. For single use plastic cutlery which do not require heat resistance, the hot-water resistance test is not a requirement.

### 4.2.4 Microwave high-frequency heat performance

When tested in accordance with Annex C, there shall be no electric sparks, no defects, odour or abnormality. There must be no defects, odour or abnormality with either test sample.

### 4.2.5 Flexural Strength Test

When tested in accordance with ASTM D790, the cutlery shall withstand a minimum bending force as specified in the Table 1 without fracture or permanent deformation.

**Table 1 — Flexural Strength Limits**

| Material | Flexural Strength |
|---|---|
| Polypropylene (PP) | ≥ 25 MPa |
| Polystyrene (PS) | ≥ 40 MPa |
| | |



 

| | |
|---|---|
| Acrylonitrile Butadiene Styrene, ABS | ≥ 60 MPa |

### 4.2.6 Microbial contamination

When tested in accordance with ISO 11737-1 and under the conditions specified in Table 2, the total aerobic microbial count on each cutlery unit shall not exceed 10 colony-forming units (CFU).

**Table 2 — Microbial testing conditions**

| Parameter | Specification |
|---|---|
| Sampling size | 3–5 units |
| Test organisms | Aerobes, coliforms, yeasts, molds |
| Acceptance criteria | ≤ 10 CFU/unit |
| Culture media | TSA, MacConkey, Sabouraud |
| Incubation | 30–35°C, 48–72 hrs |

### 4.2.7 Overall migration of chemicals

Plastic cutlery when tested in accordance with Annex D, shall not release more than 10 mg of total constituents per square decimetre (mg/dm²) of surface area into food or food simulants.

**Table 3 — Specific requirements for plastic cutlery**

| S.N | Characteristic | | Requirement | Test method |
|---|---|---|---|---|
| **1.** | Drop performance | | No cracks or splits | Annex A |
| **2.** | Hot water resistance[a] | | No deformations, peelings or wrinkles | Annex B |
| **3.** | Hot oil resistance[a] | | No deformations, peelings or wrinkles | Annex B |
| **4.** | Microwave high-frequency heat performance | | no electric sparks, no defects, odour or abnormality | Annex B |
| **5.** | Flexural strength | Polypropylene (PP) | ≥ 25 MPa | ASTM D790, Annex C |
| | | Polystyrene (PS) | ≥ 40 MPa | |
| | | Acrylonitrile Butadiene Styrene, ABS | ≥ 60 MPa | |
| **6.** | Microbial contamination, CFU/unit | | ≤ 10 | ISO 11737-1 |
| **7.** | Overall migration of chemicals, mg, max. | | 10 | Annex D |
| **8.** | | | | |
| **a** This test does not apply to single use plastic cutlery which do not require heat resistance | | | | |



 

#### 4.2.8 Colour migration

In the case of coloured plastic cutlery, colour migrated to simulant during testing under 4.2.6 shall not be apparent to naked eye. If the colour migrated is clearly visible, such materials are not suitable for food contact applications, even though the extractive value is within the limit.

#### 4.2.9 Fork prong rigidity

When tested in accordance with Annex F, the breaking force shall be more than 10 N.

## 5 Packaging

**5.1** Single-use plastic cutlery intended for food contact shall be packaged in a manner that ensures hygienic protection, prevents contamination, and maintains product integrity during handling, transport, and storage.

**5.2** The packaging shall be made from food-grade materials and may include individual wrapping, grouped sets, or bulk packaging, depending on the intended use. Where applicable, the packaging shall be sealed and tamper-evident.

## 6 Labelling

**6.1** The single-use plastic cutlery packaging material shall be labelled with the following information:

a) name of product as “Single -use plastic cutlery” or “Disposable plastic cutlery”;

b) name of the manufacturer and/or trademark;

c) form of plastic cutlery such as fork, spoon, spork, knife

d) physical address;

e) code of resin identification and symbol for recycling in accordance with EAS 1086;

f) instructions for use, hygienic care, disposal;

g) number of cultery in each package;

h) batch number;

i) month and year of manufacture; and

j) a mark indicating suitability or non-suitability for microwave use (Standardized symbols or explicit wording in accordance with recognized international or national labelling guidelines)

**6.2** Each plastic cutlery shall be legibly and indelibly marked with code of resin identification in accordance with EAS 1086

## 7 Sampling

Sampling shall be done in accordance with Annex E.



 

# Annex A
(normative)

# Determination of drop performance

## Procedure

At a normal temperature, allow the samples to drop freely, facing bottom-down, from a height of 0.8 m, onto a level cement floor. Check if the samples are intact. Extract three samples to conduct this test.



 

# Annex B
(normative)

# Determination of temperature resistance performance

## Procedure

Place two samples onto an enamel plate lined with filter paper, fill completely with hot liquid at a temperature of 100 ºC ± 5 ºC. Move the samples and leave them to stand in a thermostat container at 60 ºC for 30 minutes, then inspect the samples.

Note The “liquid” mentioned in the procedure above shall be water or oil as per the test being carried out.

# Annex C
(normative)

# Determination of microwave safety

## C.1 Microwave high-frequency heat test

### C.1.1 Apparatus

A microwave with a rated frequency modulation output power of less than 2 kW.

### C.1.2 Procedure

**C.1.2.1** Place a sample in the microwave, select the heating time from Table C.1 which corresponds to the rated output power of the microwave to heat the sample.

**Table C.1**

| **Rated output power, kW** | **Heating time, min.** |
|---|---|
| 2.0 | 1.0 |
| 1.0 | 2.0 |
| 0.6 | 3.5 |
| 0.5 | 4.0 |

**C.1.2.2** After the heating is completed, remove the sample from the microwave, cool to room temperature, and also allow the microwave to cool to room temperature.

**C.1.2.3** Test another sample repeating the above procedure.

Note This test only applies to plastic cutlery indicated, claimed or marked to be microwave safe.



 

# Annex D
(normative)

# Determination of overall migration of chemicals

## D.1 Simulants

The determination of migration in simulants is to be carried out using the simulants laid down as under:

a) simulant A — 10% Ethanol (v/v);

b) simulant B — 3 % acetic acid (w/v) in aqueous solution (prepared using distilled water');

c) simulant C1 — 20 % ethanol (v/v) in aqueous solution for foodstuffs having alcohol less than 10 %

(v/v) (prepared using distilled water');

d) simulant C2 — 50 % ethanol (v/v) in aqueous solution for foodstuffs having alcohol more than 10 %

and less than 50 % (v/v) (prepared using distilled water'); and

e) simulant D — Plant oil

f) Simulant E— MPPO (Tenax).

## D.2 Selection of standard test conditions and simulants for different foodstuffs

**D.2.1** The choice of simulating solvents and test conditions (time-temperature) depends on the type of foodstuff and condition of use of foodstuffs. Foodstuffs have been now classified into seven major groups as shown in Table 1 below. This table also gives suitable simulants to be used for different types of foodstuffs.

**Table 1 — Classification of foodstuffs and selection of simulants**

| S/N | Type of foodstuffs | | Examples | Simulants |
|---|---|---|---|---|
| 1 | Aqueous, non-acidic foods (pH > 5) without fat | | Honey, mineral water, sugar syrups, molasses, skimmed milk, infusions, yeast paste etc | A |
| 2 | Aqueous acidic foods (pH ≤ 5) without fat | | Fruit juices, squashes, fruit chunks or puree or paste, vinegar, jams, jellies, carbonated beverages, lemonade, processed vegetables, rennet, preparations of soups, broths, sauces, RTS beverages etc. | B |
| | | Alcohol concentration less than 10 % | Beer and some pharmaceutical syrups | C[1] |

| | | | | |
|---|---|---|---|---|
| 3 | Alcoholic beverages | Alcohol concentration above 10 % | Wine, brandy, whiskey, and other alcoholic drinks | C[2] |
| 4 | Oils, fats and processed dry foods with surface fat or volatile oil | | Vegetable oils, ghee, cocoa butter, lard, biscuits, spice powder, snacks and savoury. Chocolate, caramels, malted foods, egg powder, tea, coffee powder. | D |
| 5 | Non acidic foods (pH > 5) or high fat and having high moisture content | | Butter, bread, pastry, cakes, milk based sweets, ice-cream, moist and fatty confectionery products | A and D |
| 6 | Acidic foods (pH <5) or high fat and having high moisture content | | Pickles, ketchup, cheese, with low curd, fresh and processed meat and fish products, sauces having fat, frozen foods, mayonnaise etc. | B and D |
| 7 | Dry processed foods without fat | | Cereals and pulses, dehydrated vegetable and fruits, dried yeast, corn flakes, salt, sugar, milled products, barley powder, oats, vermicelli, spaghetti etc. | E |

**D.2.2** Table 2 specifies the simulants and test conditions (time-temperature) for extractability studies to be carried out as specified in 5.1 depending on the type of foodstuff and conditions of use.

**Table 2 — Simulating solvents for different types of foodstuff and temperature-time conditions**

| Conditions for use | Type of foodstuff (Table 1) | Test conditions (temperature - time) | | | | |
|---|---|---|---|---|---|---|
| | | 10% Alcohol | 3 % acetic acid | 20 % alcohol | 50 % alcohol | Plant oil |
| High temperature heat sterilised. (retorting) | 1, 2, 5, 6 | 121 $^0$C for 2 h | 121 $^0$C for 2 h | - | - | 66 $^0$C for 2 h |
| Hot filled or pasteurised above 66 $^0$C below 100 $^0$C | 1, 2, 4, 5, 6 | 100 $^0$C for 2 h | 100 $^0$C for 2 h | - | - | 49 $^0$C for 30 min |
| Hot filled or pasteurised below 66°C | 1 to 6 | 70 $^0$C for 2 h | 70 $^0$C for 2 h | 70 $^0$C for 2 h | 70 $^0$C | 38 $^0$C for 30 min |
| Room temperature filled and stored (no thermal treatment in container) and also in refrigerated and frozen condition | 1 to 7 | 40 $^0$C 10 days | 40 $^0$C 10 days | 40 $^0$C 10 days | 40 $^0$C 10 days | 20 $^0$C 10 days |



 

## D.2 Apparatus

a) cylindrical glass jar; inner dimension of 10 cm diameter and 14 cm height with 1 000 ml capacity (or 1 litre beaker);

b) water bath/electrical oven; equipped with thermostat to maintain the desired temperature up to ± 1°C;

c) glass/stainless steel pins of 7.5 cm-8.00 cm working length with extra bends at both the ends; and

d) electric hot plate, with a temperature regulator.

## D.3 Specimen size

A representative cutlery sample (e.g., spoon, fork, or knife) shall be selected such that the total surface area in contact with food is approximately 1 000 cm². Where the surface area of a single unit is less than 1 000 cm², multiple identical units shall be combined to achieve the required test surface area.

Note The surface area shall be determined by geometric approximation or displacement methods, and both sides of the article shall be considered.

## D.4 Simulant quantity

Not less than 1 000 ml to immerse the sample completely.

## D.5 Preparation of specimen

The plastic cutlery samples shall be fully immersed in the food simulant without overlapping or contact between individual units. Each sample shall be supported using inert, food-grade holders—such as glass rods, stainless steel (SS) frames, or perforated traysto ensure complete exposure of all surfaces. The arrangement shall prevent physical contact between samples and allow uniform migration conditions, as illustrated in Figure D.1.



 

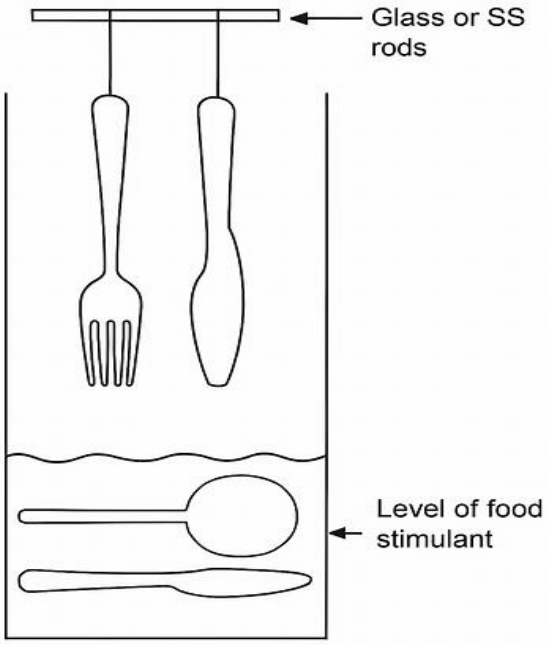


**Figure 1 - Plastic Cutlery Samples in Food Simulant for Overall Migration Testing**

## D.6 Procedure

Fill the cylindrical jar of 1 000 ml capacity with the required quantity of preheated simulant at the test temperature. Immerse the test specimen in the simulant completely. Cover with a glass plate and place the jar with sample immersed in simulant in the oven/water bath or pressure cooker/ autoclave maintained at a constant temperature for a specified period of time as specified in Table 2. At the end of the test period remove the sample with the help of glass rod and wash the sample with small quantity of fresh simulant and combine with the extractants. Concentrate the extracted simulant to 50 ml-60 ml, by evaporating on a hot plate under low heat. Transfer the concentrate into a clean tared stainless-steel dish along with three washings with small amount of fresh simulant and further evaporate the concentrate to dryness in an oven at 100 0C ± 5°C. Cool this in a desiccator for 30 min and weigh to nearest 0.1 mg till constant weight of residue is obtained.

Calculate the extractive in mg/dm$^2$ . Blank shall also be carried out without the sample.

Amount of extractive = (M/A)$\times$100 mg/dm$^2$

where

M is the mass of residue in mg minus blank value; and

A is the total surface area in cm2 exposed in each replicate.



 

# Annex E
(normative)

# Sampling

**E.1** All the single-use plastic cutlery of the same size and manufactured from the same raw materials under similar conditions of manufacture in one consignment shall constitute a lot.

**E.2** Samples shall be tested from each lot separately, for ascertaining conformity of a lot to the requirements of this standard.

**E.3** The number of plastic cutlery to be selected in the sample from a lot shall depend upon the size of the lot and shall be in accordance with Table F.1.

**Table E.1 — Scale of sampling and acceptance number**

| S/N | Number of plastic cutlery in the lot | Number of plastic cutlery to be selected | Permissible number of defectives |
|---|---|---|---|
| i) | 0 up to 300 | 9 | 1 |
| ii) | 301 – 1 000 | 18 | 1 |
| iii) | 1 001 – 3 500 | 27 | 2 |
| iv) | 3 501 and above | 45 | 3 |

**E.4** Although it is not possible to lay down any fixed rule as to how the samples are to be selected from the packages, it is desirable that the plastic cutlery be drawn evenly from as many packages as possible. However, it is recommended that at least 10 % of the packages should be selected and an equal number of plastic cutlery drawn at random from each package selected to give the required number of plastic cutlery in accordance with Column 3 of Table F.1.

# Annex F
(normative)

# Determination of fork prong rigidity

## F.1 Scope

This method describes the procedure for determining the fork prong rigidity.

## F.2 Apparatus

**F.2.1** Universal tensile tester

F.2.2 Steel mandrel, of diameter 13 mm with a step to prevent slippage during testing.

F.2.3 Fork holder, a fixture for holding the fork (see Figure F.1).

## F.3 Procedure

F.3.1 Place the fork to be tested into the fork holder (see Figure F.2). Tighten the retaining screws and insert fork

F.3.2 Stabilizer at the base of the prongs.

F.3.3 Lower the mandrel till its step lightly touches the centre prongs of the fork. Zero the load senor and use a cross- head speed of 5 mm/min.

F.3.4 Record the load of failure of the prongs.



 

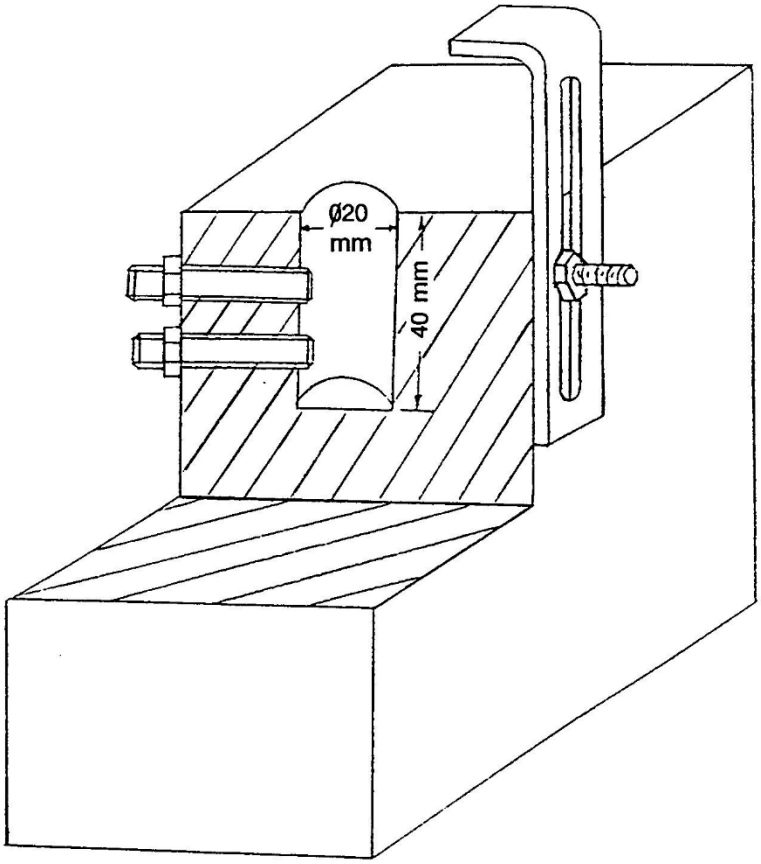


**Figure F.1 — A typical fixture**

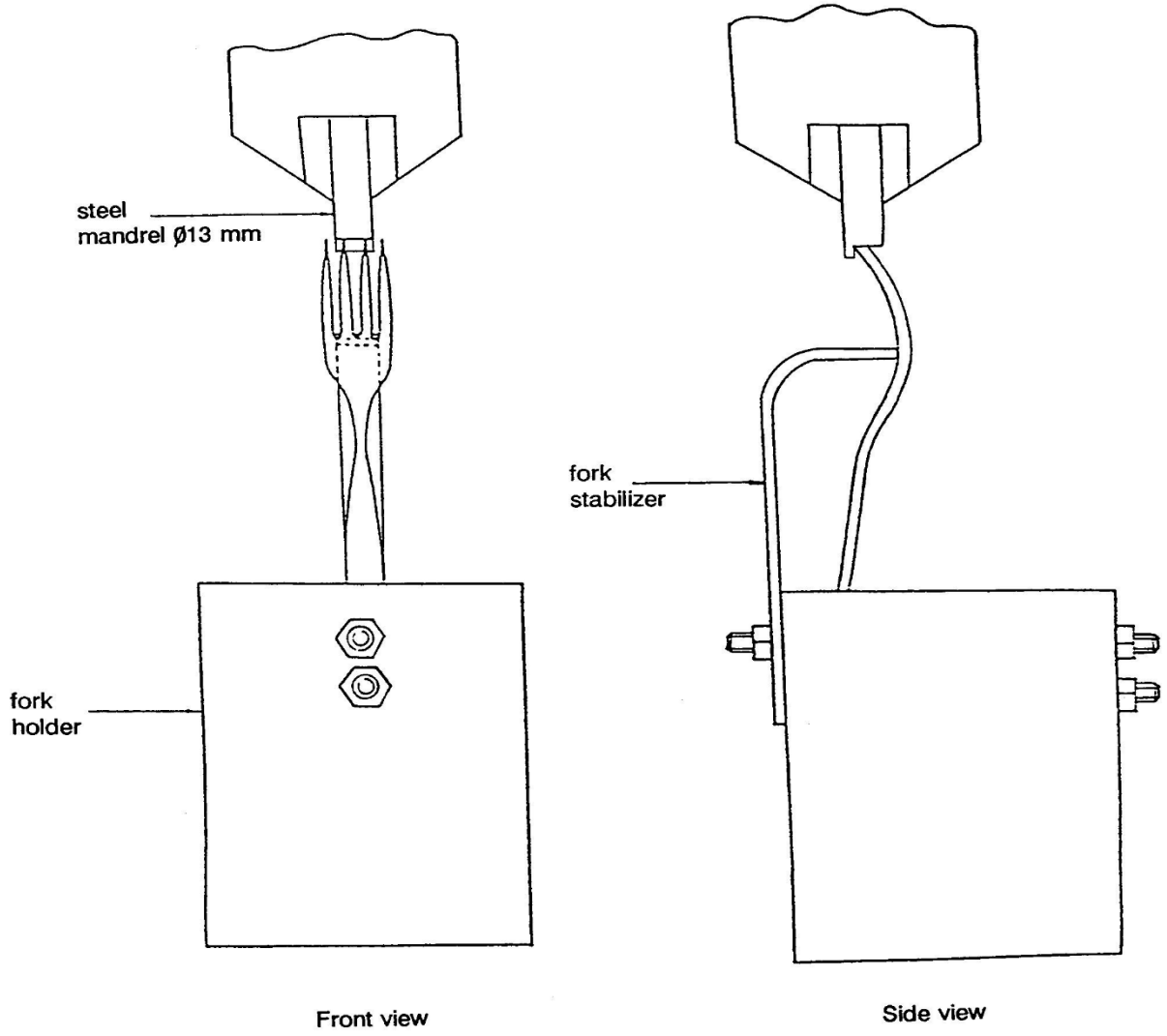


**Figure F.2 — Fork prong rigidity test**

# Bibliography

[1] GB 18006-2008, *General requirement of disposable plastic tableware*

[2] https://www.lawinsider.com/dictionary/plastic-cutlery

[3] US 1675:2017, *Determination of overall migration of constituents of plastic materials and articles intended to come in contact with foodstuffs — Method of analysis*

[4] US 1659:2017, *Materials in contact with food — Requirements for packaging materials*



 